P-ISSN:
E-ISSN: 3025-0501

Almakki Health Informatics Journal

Diagnostic Approach to Patients with Hepatic Abscess: A Case Report

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KEYWORDS

Hepatic abscess; amoeba; drainage; laparotomy; pyogenic

ABSTRACT

Hepatic abscess is a severe infection characterized by pus accumulation within the liver, often caused by bacterial or amoebic pathogens. This case report discusses the diagnostic challenges and management of bilateral hepatic abscesses in a resource-limited setting. A 43-year-old male presented with right upper quadrant abdominal pain, jaundice, and systemic symptoms. Diagnostic investigations, including ultrasonography and contrast-enhanced CT scan, revealed abscesses in the right and left hepatic lobes. Laboratory findings showed leukocytosis, hypoalbuminemia, and elevated liver enzymes. The patient was treated with empiric antibiotics and underwent laparotomy for abscess drainage, yielding 1700 cc of pus. Postoperative recovery was uneventful, with significant clinical improvement. This study highlights the importance of a combined medical and surgical approach in managing complex hepatic abscess cases, particularly in settings with limited diagnostic resources. The findings emphasize early diagnosis, multidisciplinary care, and tailored treatment strategies to improve outcomes for patients with hepatic abscesses, especially in underserved regions.

INTRODCUTION

Hepatic abscess is a form of infection in the liver characterized by the presence of pus enveloped by fibrous tissue in the hepatic parenchyma. A hepatic abscess is a pus-filled mass in the hepatic cavity that may result from hepatic trauma or intra-abdominal infection spreading from the portal circulation. The majority of these abscesses are categorized into pyogenic, amoebic, a small proportion are caused by parasites and fungi.(Akhnodi & Sabih, 2023) Hepatic abscesses are most commonly caused by bacterial infection, which can be gram-positive cocci, gram-negative bacilli, or anaerobic organisms, and are known as pyogenic hepatic abscesses.(Wadhera et al., 2022) Hepatic abscesses can be single or multiple. Hepatic abscesses are more common in the right lobe than both lobes or the left lobe (60-70% vs. 25% and 15% of cases, respectively).(Kozielewicz et al., 2021) Hepatic abscesses are rarely in the left lobe or caudate lobe because the main blood supply comes from the superior mesenteric vein.

The incidence of hepatic abscess varies by region. The incidence is highest in eastern countries, especially Taiwan. The incidence in Taiwan is 275 per 100,000 people versus 2.3 cases per 100,000 people in the United States.(Wadhera et al., 2022) Risk factors for hepatic asbestos are a history of diabetes mellitus (DM), liver cirrhosis, long-term use of PPI (*proton pump inhibitors*) drugs, male gender, age in the fourth to fifth decade of life, and malnutrition.(Qureshi et al., 2024)(Kozielewicz et al., 2021) A person who is immunocompromised during chemotherapy, immunosuppressive treatment, and

immunodeficiency syndrome, has a higher risk of developing hepatic abscesses caused by fungi and opportunistic microorganisms.(Kozielewicz et al., 2021)

The causative organisms of pyogenic hepatic abscesses are generally polymicrobials, namely *Escherichia coli, Klebsiella pneumoniae, Streptococcus, Staphylococcus*, and anaerobic organisms. The causative organism of amoebic hepatic abscess is *Entamoeba histolytica*.(Akhnodi & Sabih, 2023)(Wadhera et al., 2022) Infection can spread through hematogenous spread, blunt or penetrating trauma, biliary tract, continuation of the inflammatory process from adjacent areas, and postoperatively(Kozielewicz et al., 2021) Intra-abdominal infections are prone to spread to the liver, such as in appendicitis and diverticulitis. Organisms enter through the portal vessels and the liver is the first organ encountered by the organisms. (Wadhera et al., 2022)

The typical clinical manifestations of hepatic abscess are fever and abdominal pain. The classic clinical triad is fever, abdominal pain, and malaise. High fever is associated with pyogenic hepatic abscess. Abdominal pain is localized to the right upper quadrant. Abdominal pain is caused by inflammation in the hepatic area due to subcapsular abscess, stretching due to hepatomegaly, or gallbladder edema.(Wadhera et al., 2022) Other symptoms include nausea, vomiting, malaise, chills, weight loss, and diarrhea.(Kozielewicz et al., 2021; Wadhera et al., 2022) If the abscess occurs in the left lobe of the liver, a mass will be found in the epigastric region, with epigastric, preoperative, or retrosternal pain.(Prasetyono, n.d.) Physical examination reveals tachycardia, right upper quadrant tenderness, and hepatomegaly(Kozielewicz et al., 2021)

Imaging is the modality of choice to diagnose hepatic abscess. Commonly used methods are ultrasound (ultrasonography) and CECT (*contrast-enhanced computerized tomography*). Abdominal ultrasound is performed in all cases of suspected hepatic abscess and has a sensitivity of 85%. In clinical practice contrast-enhanced abdominal CECT is performed if the clinical suspicion is for hepatic abscess, but the initial ultrasound results are not supportive. A hepatic abscess will show a *hypoechoic* image and may vary with debris, gas or septa. CECT has a higher sensitivity of 95-97%.(Wadhera et al., 2022) Hepatic abscesses in the right and left lobes require special attention and immediate treatment as they are at risk of rupturing into the peritoneal cavity or pericardium.

Several studies have investigated the relationship between prostate volume, intravesical prostate protrusion (IPP), and bladder detrusor muscle thickness in patients with benign prostate enlargement (BPE). Gandhi et al. (2018) highlighted the clinical significance of IPP as a predictor of bladder outlet obstruction, correlating it with structural changes in the bladder wall. Research by Güzel et al. (2015) emphasized the use of bladder wall thickness as a non-invasive diagnostic marker for obstruction severity in BPE patients. Additionally, Rusdiono (2013) identified a strong correlation between detrusor wall thickness and IPP length in transabdominal ultrasonography, providing insights into the pathophysiological mechanisms of chronic urinary obstruction. These findings collectively underscore the utility of imaging techniques in assessing disease progression and guiding management strategies for BPE.

Hepatic abscess is a serious condition with varying causes, including bacterial and amoebic infections. Previous studies, such as those by Wadhera et al. (2022) and

Kozielewicz et al. (2021), have highlighted the clinical manifestations and treatment modalities for hepatic abscess, emphasizing the role of imaging modalities like ultrasonography and CT scans in diagnosis. Wadhera et al. demonstrated the effectiveness of empiric antibiotics combined with drainage procedures for larger abscesses, while Kozielewicz focused on the epidemiology and risk factors, noting that the incidence is significantly higher in Eastern countries, particularly Taiwan. Swartawan and Saputra (2023) explored challenges in distinguishing amoebic from pyogenic abscesses, citing limitations in laboratory diagnostics in resource-limited settings. These studies underscore the complexity of hepatic abscess management, especially in regions with limited healthcare infrastructure.

While extensive research exists on the diagnosis and management of hepatic abscess, there remains a gap in studies addressing the combined approach of medical therapy and surgical interventions, particularly in cases involving bilateral hepatic abscesses. Most research focuses on unilateral abscesses or emphasizes either medical or surgical management in isolation. Additionally, limited studies have explored the challenges of diagnosis and treatment in resource-constrained healthcare facilities, where diagnostic tools like serology tests and culture examinations may not be readily available.

This study presents a unique case of bilateral hepatic abscesses treated with a combination of laparotomy drainage and empiric antibiotic therapy, demonstrating an effective approach in a resource-limited setting. Unlike previous studies, this research integrates clinical, imaging, and intraoperative findings to provide a comprehensive evaluation of diagnosis and treatment strategies. It also highlights the importance of tailored management plans for complex hepatic abscess cases, contributing valuable insights to the existing body of literature.

The primary objective of this study is to evaluate the effectiveness of a combined medical and surgical approach in managing bilateral hepatic abscesses. The study aims to provide a detailed analysis of diagnostic challenges, treatment outcomes, and post-operative recovery. The findings will benefit clinicians by offering practical guidance for managing complex hepatic abscess cases and informing treatment protocols in resource-limited settings. Furthermore, this research emphasizes the importance of early intervention and multidisciplinary collaboration, ultimately improving patient outcomes and reducing healthcare burdens associated with hepatic abscesses.

CASE REPORT

A 43-year-old man was brought by his family to the emergency room of Bangli Hospital, Bali with complaints of abdominal pain. Abdominal pain was felt in the upper right and solar plexus since 3 weeks before admission to the hospital, worsening since 1 week. The abdominal pain was felt continuously. The patient also complained of yellow, especially in the eyes, which the patient had just realized since 1 week. The yellowing of the eyes was accompanied by more concentrated urination than usual. Other complaints such as fever disappeared. The patient feels bloated and nauseous but not accompanied by vomiting. The patient feels that his appetite has decreased compared to when he was healthy. Bowel movements were sometimes liquid mixed with mucus and no blood. During these complaints the patient was taken to an independent practicing doctor, the name and type of medicine were unknown, but the complaints did not decrease. The patient denied any history of chronic illness.

On physical examination, the patient's consciousness and orientation were good, the patient's blood pressure was 110/70 mmHg, pulse was 96 x/min, respiratory frequency was

20 x/min, temperature was 38.0^0C (axillary) and SpO2 was 98% room air. Physical examination revealed icteric and anemic eyes. No enlarged lymph nodes were found. Lung and heart examinations were within normal limits. Abdominal examination found no distension, bowel noise is still within normal limits. On palpation, the liver was palpated three fingers below the *arcus costae* and three fingers below the *prosessus xiphoideus* with a smooth surface and pain on pressure. Pain was also felt in the epigastric region. The spleen was not palpable and there was no ascites.

Laboratory examination revealed mild normochromic anemia (hb 11.1 g/dL and normal MCV and MCHC), leukocytosis (wbc 24.6 10*3/uL). Liver function examination revealed elevated ALT (*alanine aminotransferase*) (72 U/L) and elevated total bilirubin, rec bilirubin and independent bilirubin (2.23 mg/dl; 1.06 mg/dl; 1.17 mg/dl, respectively). There was hypoalbuminemia in the patient (albumin 2.52 g/dL). The laboratory examination can be seen in Table 1.

The results of *ultrasonography* (USG) examination showed a thick-walled *hypoechoic* cystic lesion, with firm boundaries and *lobulated* edges, suggestive of an abscess in the right lobe of the hepar measuring 10.2x10.5x10.4 cm. The results of abdominal *computerized tomography* (CT) scan with contrast showed hepatic enlargement and hypodense lesions in the right lobe of the hepatic with a size of 9.6 cm x 9.6 cm x 9.8 cm and the left lobe with a size of 8.4 cmx 7.5cmx 10.4 cm with a picture of *rim enhancing double layer* confirming hepatic abscess with amoebic hepatic abscess characteristics in the right and left lobes.

Based on the examination results, a working diagnosis of right and left lobe hepatic abscess was made. Based on consultation with the surgery department, it was recommended to perform a laparotomy to drain the abscess fluid. From the operation report, it was found that the abscess was located in the right and left lobe of the hepatic. The 1700 cc cloudy yellow liquid was successfully removed and followed by tube insertion to drain the remaining pus. The pus culture examination showed no growth of microorganisms from the pus specimen. After the procedure, the patient was hospitalized for 3 days and received therapy such as metronidazole, cefoperazone sulbactam and analgesics such as intravenous paracetamol.

On the third day after abscess drainage, the general condition was good, vital signs were within normal limits, and no other complaints were found so the patient was discharged. The patient returned for control 1 week later. There were no complaints, the wound closed well, and no complications were found in the patient.

Table1 . Laboratory Examination Results

Parameters	Results	Unit	Normal Value
Complete Peripheral Blood			
HGB	11.1	g/dL	13-17.5
HCT	33	%	40-50
PLT	455	10*3/uL	150-350
WBC	24.6	10*3/uL	3.5-9.5
RBC	3.73	10*6/uL	4.3-5.8
MCV	88.5	fL	82-100
MCHC	33.6	g/dL	31.6-35.4
Diff			

N segment	87.6	%	40-75
Lymphocytes	5	%	20-50
Monocytes	5.7	%	3-10
Eosinophils	1.4	%	0.4-8
Basophils	0.3	%	0-1
		Blood Chemistry	
SGOT/AST	30	U/L	0-38
SGPT/ALT	72	U/L	0-41
Total Bilirubun	2.23	mg/dl	0-1.1
Bilirubin Direct	1.06	mg/dl	0-0.4
Indirect Bilirubin	1.17	mg/dl	0.2-0.7
Albumin	2.52	g/dL	3.2-5.2
Blood Glucose	105	mg/dL	70-140
Creatinine	0.82	mg/dL	0.7-1.2
Urea	28	mg/dL	15-40
		Immuno-Serologist	
Anti HCV	Non-reactive		-
HBsAg	Non-reactive		-

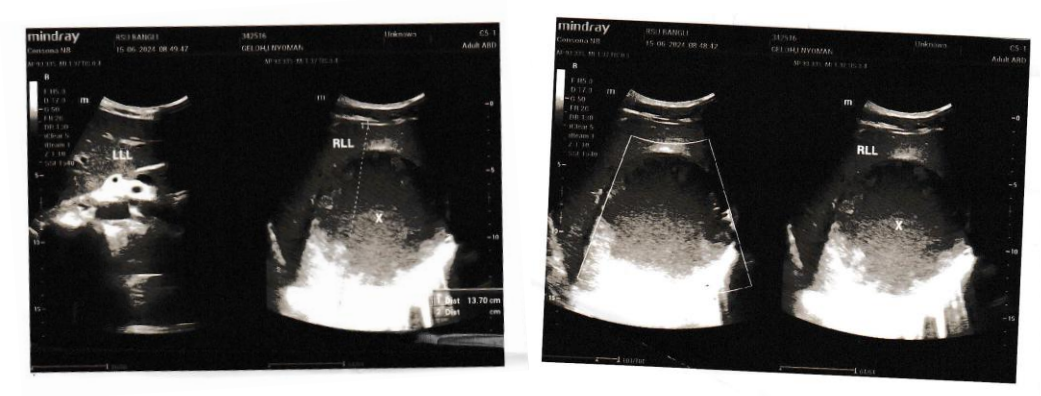

Figure 1. Abdominal *ultrasonography* (USG) examination results

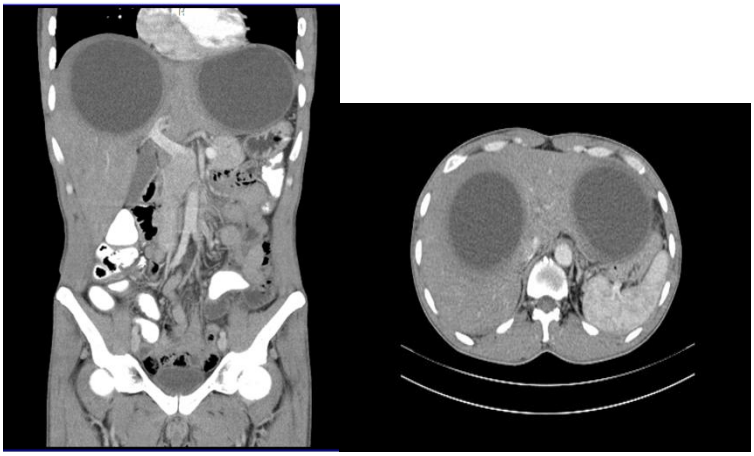

Figure 2. *Computerized tomography* (CT) scan of the abdomen with contrast.

RESULT AND DISCUSSION

Hepatic abscess is an infection characterized by the presence of pus enveloped by fibrous tissue in the hepatic parenchyma. The majority of these abscesses are categorized into pyogenic, amoebic, a small number are caused by parasites and fungi.(Akhnodi & Sabih,

2023) We report hepatic abscesses located in the right and left lobes. Cases of hepatic abscess located in both lobes are rare.(Kozielewicz et al., 2021)

The diagnosis of hepatic abscess in the patient was made by history taking, physical examination and supporting examination. Typical manifestations of hepatic abscess are fever and right upper abdominal pain, and malaise. Other symptoms that may be found include nausea, vomiting, jaundice and a history of mucus diarrhea.(Wadhera et al., 2022)The patient's heartburn was related to the location of the hepatic abscess in the left lobe.(Sjamsuhidajat et al., 2016)Only a quarter of patients with hepatic abscesses are jaundiced. (Wadhera et al., 2022)The patient's jaundice was related to the large size of the abscess and compression of the bile ducts.(Sharma & Ahuja, 2021)

Laboratory examination showed mild normocytic normochromic anemia and leukocytosis. This patient also had elevated ALT (*alanine aminotransferase*), elevated bilirubin, and hypoalbuminemia. The laboratory findings in this case are some of the common laboratory findings seen in hepatic abscesses and do not show specific signs of infection.(Wadhera et al., 2022)(Sjamsuhidajat et al., 2016) Elevated bilirubin is rare, but when present indicates the severity of the disease.(Sjamsuhidajat et al., 2016)

Imaging is an important tool to diagnose hepatic abscess.(Setiati et al., 2014) Abdominal ultrasonography (USG) and abdominal CT scan with contrast supported the diagnosis of hepatic abscess in this patient. The results of abdominal *computerized tomography* (CT) scan with contrast showed a hypodense lesion in the right lobe of the hepatic with a size of 9.6 cm x 9.6 cm x 9.8 cm and the left lobe with a size of 8.4 cmx 7.5cmx 10.4 cm with a *rim enhancing double layer* image confirming hepatic abscess with amoebic hepatic abscess features in the right and left lobes.

The diagnosis of amoebic and pyogenic hepatic abscess is difficult to distinguish based on clinical manifestations. Laboratory examinations such as leukocytosis, elevated CRP, elevated alkaline phosphatase, and abnormal liver function still cannot distinguish the two types of hepatic abscess (Swartawan & Saputra, 2023). Amoebic serology test is one of the tests that has high sensitivity and specificity for amoebic infection so it can be considered to distinguish amoebic and pyogenic hepatic abscesses.(Sjamsuhidajat et al., 2016) In this case, serology tests could not be performed due to limited facilities. The results of the pus culture examination showed no growth of microorganisms from the pus specimen.

There are several treatment modalities for hepatic abscess. In the case of a hepatic abscess, cultures should be taken before starting antibiotics. Antibiotics should be started immediately to reduce septicemia and systemic complications and should later be adjusted according to the culture results. In the field, hepatic abscess therapy is often started before proper sampling and the cause of the abscess is still unclear, with empirical antibiotics to address possible amoebic and bacterial causes. Current recommendations state that hepatic abscesses less than 3 cm to 4 cm can be treated with antibiotic therapy with a 100% success rate(Wadhera et al., 2022) Empiric antibiotics should be directed against the organism causing the hepatic abscess. Empiric antibiotic regimens should also include *Entamoeba histolytica* unless clinical suspicion for this infection is very low. Commonly used antibiotics include piperacillin and tazobactam, third-generation cephalosporins (ceftriaxone and cefotaxime), and carbapenems. Metronidazole should be considered if the previous antibiotic

regimen is ineffective and an amoebic abscess is suspected. The duration of antibiotic therapy varies from 2 to 6 weeks. [3]Metronidazole is also given in hepatic abscesses with multiple sources of infection to overcome anaerobic infection. [7]

In this case the abscess was more than 5 cm in size and required a surgical approach. In general, surgical drainage is indicated in cases of peritonitis, abscess rupture, large abscesses in difficult anatomical locations, or if the patient requires surgery for other indications. [2] The patient was treated with antibiotic therapy and laparotomy drainage of the abscess. The indication in this patient was a left lobe abscess that required immediate treatment because the location of the abscess had a risk of perforating into the peritoneal cavity or pericardium. [5]

CONCLUSION

Hepatic abscess is an infection characterized by the presence of pus in the liver. The diagnosis of hepatic abscess in this patient was concluded from clinical symptoms, physical examination and supporting examination (ultrasonography and abdominal ct-scan with contrast). Management of hepatic abscess in this patient was in the form of medical therapy and laparotomy abscess drainage which showed good results.

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